

Predatory mite *Neoseiulus barkeri* restricts outbreaks of bulb scale mite in *Hippeastrum* (amaryllis)

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The bulb scale mite *Steneotarsonemus laticeps* is a serious pest in the culture of *Hippeastrum* (amaryllis). These tiny mites can cause dramatic growth inhibition and flower deformation. Since effective biological control agents are lacking, control relies heavily on chemicals.

Greenhouse survey of predatory mites

A survey of naturally occurring predatory mites with a potential to control *S. laticeps* was conducted on 15 commercial greenhouses with amaryllis. 15 species of predatory mites were found. The most abundant species was *Neoseiulus barkeri*, which was found on almost half of the nurseries sampled and was observed frequently in colonies of *S. laticeps*.

Laboratory predation experiments

Laboratory predation tests were set up with *Neoseiulus barkeri* as well as commercially available predatory mites to evaluate their ability to feed on *S. laticeps*. Predators were tested after a starvation period of 48 hours. Results indicate *N. barkeri* to be a promising candidate for biological control of the bulb scale mite in amaryllis (Table 1).

Table 1. Mean fraction of predation attempt and successful predation with the bulb scale mite as prey during five minutes observations in the laboratory.

Predatory mite	Predation attempt*	Successful predation
<i>Neoseiulus barkeri</i>	0.917 a	0.854 a
<i>Amblyseius andersoni</i>	0.833 a	0.708 ab
<i>Neoseiulus cucumeris</i>	0.833 a	0.688 b
<i>Hypoaspis miles</i>	0.083 b	0.083 c
<i>Hypoaspis aculeifer</i>	0.021 b	0.000 c

* Means within a column are significantly different ($p < 0.05$) if not followed by the same letter.



Foto 1:
Female of *Neoseiulus barkeri* feeding on *Steneotarsonemus laticeps*.

Predation efficacy was correlated with body size of the various species. The small body size and short hairs of *N. barkeri* are believed to enable this species to follow *S. laticeps* in hidden places deep inside the bulbs (Figure 1).

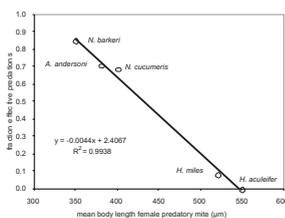


Figure 1:
Correlation between predatory mite size and predation efficacy with the bulb scale mite as prey.

Greenhouse experiment

The ability of *N. barkeri* and *Amblyseius andersoni* to control the bulb scale mite in amaryllis was assessed in a greenhouse. The pest was introduced by interplanting infested bulbs. The visible damage in the mite treatments was much lower, reaching a maximum of 10% in the plots with *N. barkeri* and about 30% with *A. andersoni* (Figure 2).

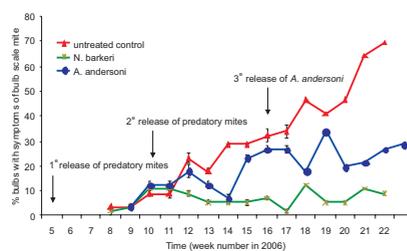


Figure 2.
Mean percentages of visible damage by bulb scale mites on amaryllis bulbs.

The number of damaged bulbs (foto 2) was much higher at the final assessment when all bulbs were sliced and examined carefully. The number of damaged bulbs and leaves was significantly lower in the predator treatments, with *N. barkeri* significantly better than *A. andersoni* (Table 2). Neither *N. barkeri* nor *A. andersoni* appear to be able to completely eliminate a bulb scale mite infection in amaryllis.



N. barkeri colonized the amaryllis crop throughout the observation period, though in low numbers. *A. andersoni* could not be detected anymore from week 22, in spite of an additional introduction.

Table 2: Mean percentage of leaves and bulbs injured by the bulb scale mite at the final assessment in week number 23.

Treatment	Mean percentage of injury*	
	Leaves	bulbs
Control	57 a	98 a
<i>N. barkeri</i>	4 c	45 c
<i>A. andersoni</i>	19 b	70 b

* Means within a column are significantly different ($p < 0.05$) if not followed by the same letter.

The results of this study show the potential of *N. barkeri* to establish in an amaryllis crop and restrict hot spots with bulb scale mites. Ways should be found to improve the establishment of this predator for further improvement of the quality of bulb scale mite control.

Messelink, G.J. & van Holstein-Saj R. 2006: Potential for biological control of the bulb scale mite (Acari: Tarsonemidae) by predatory mites in amaryllis. Proc. Neth. Entomol. Soc. Meet. 17: 113-118.
Messelink, G.J. & van Holstein-Saj R. 2007: Biological control of the bulb scale mite *Steneotarsonemus laticeps* (Acari: Tarsonemidae) with *Neoseiulus barkeri* (Acari: Phytoseiidae) in amaryllis. IOBC/wprs Bulletin 30 (5): 81-85.